**130.324. Advanced Welding (Two to Three Credits).**

(a)  General requirements. This course is recommended for students in Grades 11-12. Recommended prerequisites: Algebra I or Geometry and Welding.

(b)  Introduction. Advanced Welding builds on knowledge and skills developed in Welding. Students will develop advanced welding concepts and skills as they relate to personal and career development. This course integrates academic and technical knowledge and skills. Students will have opportunities to reinforce, apply, and transfer knowledge and skills to a variety of settings and problems.

(c)  Knowledge and skills.

(1)  The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills. The student is expected to:

(A)  analyze how effective teams function;

(B)  apply teamwork to solve advanced problems;

(C)  distinguish team roles such as team leaders and team members;

(D)  evaluate characteristics of good leaders;

(E)  use employers' work expectations to measure project success;

(F)  evaluate team performance in using time-management techniques to develop work schedules; and

(G)  develop a method to evaluate team performance.

(2)  The student explores the employability characteristics of a successful worker in the global economy. The student is expected to:

(A)  apply academic knowledge and skills required for postsecondary education;

(B)  use employers' expectations to evaluate student performance and customer satisfaction;

(C)  demonstrate the skills required in the workplace such as interviewing skills, flexibility, willingness to learn new skills and acquire knowledge, self-discipline, self-worth, positive attitude, and integrity in a work situation;

(D)  evaluate progress toward personal career goals;

(E)  communicate effectively with others in the workplace to clarify objectives; and

(F)  apply knowledge and skills related to health and safety in the workplace, as specified by appropriate government regulations.

(3)  The student applies academic skills to the requirements of welding. The student is expected to:

(A)  differentiate effective communication skills with individuals from varied cultures such as fellow workers, management, and customers;

(B)  demonstrate mathematical skills to estimate costs;

(C)  determine the impact of inaccurate readings of measuring devices on cost estimates;

(D)  justify the selection of a tool to make accurate measurements;

(E)  compute measurements such as area, surface area, volume, and perimeter;

(F)  calculate problems using whole numbers, fractions, mixed numbers, and decimals;

(G)  use a calculator to perform advanced computations;

(H)  apply right triangle relationships using the Pythagorean Theorem; and

(I)  defend the choice of a mathematical solution using estimation.

(4)  The student knows the function and application of the tools, equipment, technologies, and materials used in welding. The student is expected to:

(A)  use welding equipment according to safety standards;

(B)  dispose of environmentally hazardous materials used in welding;

(C)  determine the performance impact of emerging technologies in welding;

(D)  use appropriate personal protective equipment to follow safety measures; and

(E)  investigate the use of automated welding machines such as numerical control, computer numerical control, and robotics-controlled welding machines.

(5)  The student illustrates welding joint design, symbols, and welds. The student is expected to:

(A)  use knowledge of welding blueprints to complete an advanced project; and

(B)  inspect projects using welding blueprints.

(6)  The student applies the concepts and skills of welding to perform tasks. The student is expected to:

(A)  work independently to fabricate a welded project;

(B)  work collaboratively with other students to complete a real-world application item; and

(C)  troubleshoot equipment.

(7)  The student knows the concepts and intricacies of inspections and related codes. The student is expected to:

(A)  inspect welding projects of team members;

(B)  use advanced codes for weld inspections; and

(C)  critique welds of team members.

(8)  The student performs advanced oxy-fuel processes on carbon steels. The student is expected to:

(A)  observe safe operating practices;

(B)  apply safe handling of compressed gases; and

(C)  perform advanced cutting processes according to accepted welding standards.

(9)  The student performs plasma arc cutting on metals. The student is expected to:

(A)  observe safe operating practices; and

(B)  perform advanced shape cutting processes according to accepted welding standards.

(10)  The student performs shielded metal arc welding on metals. The student is expected to:

(A)  use safe operating practices; and

(B)  demonstrate advanced knowledge of qualified welding positions using accepted welding standards.

(11)  The student performs gas metal arc welding. The student is expected to:

(A)  use safe operating practices;

(B)  perform fillet welds;

(C)  perform groove welds; and

(D)  perform welds in all appropriate positions according to accepted welding standards.

(12)  The student performs advanced flux cored arc welding on metals. The student is expected to:

(A)  use safe operating practices;

(B)  perform fillet welds;

(C)  perform groove welds; and

(D)  perform welds in all appropriate positions according to accepted welding standards.

(13)  The student performs gas tungsten arc welding on metals. The student is expected to:

(A)  use safe operating practices;

(B)  perform fillet welds;

(C)  perform groove welds;

(D)  perform welds in all appropriate positions according to accepted welding standards; and

(E)  perform welds on metals such as carbon steel, stainless steel, pipe, and aluminum.